

PROJECT TITLE : SPOTLESS
PERIOD COVERED : JUNE 1980
WRITTEN BY : F. MOSER

OBJECTIVE

To produce prototype cigarettes which are denitrated, but otherwise correspond to commercial cigarettes. Two series of prototypes have been selected for the project, one representing American blend cigarettes and the other aircured type cigarettes. The whole Spotless project includes 16 different cigarette brands (7 for the aircured type and none for the American blend type) all cigarettes are ready.

EXPERIMENTAL WORK

The tobaccos for the project correspond to BRD Atlantic 8331 for the air-cured type and to MLF Atlantic 8222 for the blend type cigarettes.

Although eventually the tobaccos for the cigarettes will be submitted for a true denitration procedure in which the water solubles are not lost, as a first step it was decided to use aqueous extraction, to discard the extract and to compensate only for the loss of potassium ions by adding potassium citrate. In fact, as can be seen from the figures in table 1, the loss has not quite been made up for, due, probably, to some loss of potassium citrate in the flavouring cylinder during spraying.

The blend components for each type of cigarette were extracted separately in cut rag form as well as in the ready blended form. This was chosen simply as control measure.

The extraction was carried out by the Process Development Group in the Pilot Plant using a rotary segmented extractor and water of 80° C.

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The following listing recalls the coding allocated to the individual experimental cigarettes:

First sign : Ø (zero) for the year 1980
A : for air-cured type (red label)
B : for blend type (black label)
SPO : for denitrated

1 ØS-A-TOT	red label	1 ØS-B-TOT	black label
2 ØS-A-TOT/SPO		2 ØS-B-TOT/SPO	
3 ØS-A-MD		3 ØS-B-FC	
4 ØS-A-CH		4 ØS-B-BU	
5 ØS-A-MD/SPO		5 ØS-B-OR	
6 ØS-A-CH/SPO		6 ØS-B-FC/SPO	
7 ØS-A/SPO/SPO		7 ØS-B-BU/SPO	
	8 ØS-B-OR/SPO		
	9 ØS/SPO/SPO/SPO		

The TLA results for the cigarettes are listed in tables 2-8. Comparison is in certain cases difficult because of unsuitable cigarette RTD's. However, some of the results are startling. In table 2 the value for TPM of the non-extracted control cigarette 1 ØS-A-TOT is 16.8, for the cigarette of bulk extracted tobaccos 2 ØS-A-TOT/SPO 16.1 and for the cigarette with individually extracted blend components 7 ØS-A-SPO/SPO 14.8. One might have expected a larger influence of nitrate removal on TPM. Perhaps the nitrate removal is being compensated by the associated removal of other solubles. In the blend version, table 5, there is a TPM reduction but, of course, the puff number is reduced.

Obviously, a number of speculations spring to mind when pondering over these tables but they require some experimental follow-up.

F. Moser

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TABLE 1

Project Spotless: Washing - Efficiency on $N\text{-NO}_3$ and K

Sample	% $N\text{-NO}_3$	% Efficiency	% K	% Efficiency	% K after addition of Tri-K-Citrate
1 $\varnothing S\text{-A-TOT}$	0.275	89.1	4.85	93.2	
2 $\varnothing S\text{-A-TOT/SPO}$	0.03		0.33		3.57
3 $\varnothing S\text{-A-MD}$	0.25		4.79		
5 $\varnothing S\text{-A-MD/SPO}$	0.02	92	0.33	93.1	3.54
4 $\varnothing S\text{-A-CH}$	0.30		4.65		
6 $\varnothing S\text{-A-CH/SPO}$	0.02	93.3	0.29	93.8	3.85
1 $\varnothing S\text{-B-TOT}$	0.35		3.75		
2 $\varnothing S\text{-B-TOT/SPO}$	0.015	95.7	0.32	91.5	3.06
3 $\varnothing S\text{-B-FC}$	0.03		3.08		
6 $\varnothing S\text{-B-FC/SPO}$	0.007	76.7	0.59	80.8	2.80
4 $\varnothing S\text{-B-BU}$	0.46		4.99		
7 $\varnothing S\text{-B-BU/SPO}$	0.05	89.1	0.27	94.6	4.27
5 $\varnothing S\text{-B-OR}$	0.03		2.23		
8 $\varnothing S\text{-B-OR/SPO}$	0.002	93.3	0.33	85.2	1.62

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TABLE 4

Project: Spotless		4 ØS-A-CH	6 ØS-A-CH/SPO
<u>Filler</u>			
Alkaloids tot.	%	0.71	0
Reducing sugars	%	0	0
Nitrate Nitrogen	%	0.33	0
Ammonia Nitrogen	%	0.74	0
Kjedahl Nitrogen	%	3.79	
Total Nitrogen	%	4.30	
<u>Filter</u>			
SN	mg /F	0.67	0.16
HCN	µg /F	129	39
Aed.	mg /F	0.59	0.50
<u>Smoke</u>			
CO	mg /Cig.	21.5	17.7
NO	mg /Cig.	0.36	0.04
TPM	mg /Cig.	21.9	15.3
SN	mg /Cig.	0.62	0.13
Puff	Number	7.2	7.4
HCN	µg /Cig.	146	724
Aed	mg /Cig.	7.25	1.62
ISH	%	48	27

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Project: Spotless	1 Øs-B-Tot	2 Øs-B-Tot/SPO	3 Øs-B/SPO/SPO/SPO
Acids tot.	0.96	0.18	0.13
Reducing Sugars	0.7	0	0
Nitrate Nitrogen	0.25	0	0
Ammonia Nitrogen	0.31	0.05	0
Kjeldahl Nitrogen	3.22	3.47	3.47
Total Nitrogen			%
Fileter			
SN	1.06	0.13	0.12
HCN	58	28	32
Acid.	0.48	0.52	0.55
Smoke			
CO	16.1	15.3	15.7
NO	0.31	0.03	0.03
TFM	19.1	13.2	15.4
SN	0.31	0.12	0.14
PFaff	8.0	6.4	6.5
HCN	2.43	5.1	5.1
Acid	1.41	1.40	1.45
15H	38	34	36

Project: Spotless		3 φs - B - FC	6 φs - B - FC / SPO
<u>Filler</u>			
Alkaloids tot.	%	2.90	0.30
Reducing sugars	%	9.5	0
Nitrate Nitrogen	%	0.08	0
Ammonia Nitrogen	%	0.08	0
Kjedalne Nitrogen	%	2.88	
Total Nitrogen	%	2.96	
<u>Filter</u>			
SN	mg / F	1.31	0.32
HCN	ug / F	68	67
Aed.	mg / F	0.69	0.76
<u>Smoke</u>			
CO	mg / Cig.	16.5	15.9
NO	mg / Cig.	0.10	0.03
TPM	mg / Cig.	22.4	22.0
SN	mg / Cig.	1.86	0.30
Puff	Number	8.3	7.1
HCN	ug / Cig.	244	149
Aed	mg / Cig.	1.56	1.76
ISH	%	34	33

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TABLE 8

Project: Spotless		5 Ø's - B - OR	8 Ø's - B - OR / SPO
<u>Filter</u>			
Alkaloids tot.	%	0.96	0.11
Reducing sugars	%	15.7	0
Nitrate Nitrogen	%	0.04	0
Ammonia Nitrogen	%	0.08	0
Kjeldahl Nitrogen	%	2.16	
Total Nitrogen	%	2.20	
<u>Filter</u>			
SN	mg / F	0.72	0.15
HCN	µg / F	63	43
Aed.	mg / F	0.80	0.73
<u>Smoke</u>			
CO	mg / Cig.	19.2	14.7
NO	mg / Cig.	0.12	0.04
TPM	mg / Cig.	25.3	18.4
SN	mg / Cig.	1.07	0.11
Puff	Number	15.7	7.1
HCN	µg / Cig.	20.2	16.0
Aed	mg / Cig.	1.54	1.62
ISH	%	33	32

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